CROP BIOTECH UPDATE

A weekly summary of world developments in agri-biotech for developing countries, produced by the Global Knowledge Center on Crop Biotechnology, International Service for the Acquisition of Agri-biotech Applications SEAsiaCenter (ISAAA)

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In This Issue:

NEWS

RABOBANK SAYS HALF OF WORLD COTTON MAY SOON BE GM

Genetically modified (GM) cotton planted worldwide may account for more than 50 percent by 2006-07 from the present 35 percent. This was the projection of a cotton industry report released by the Netherlands-based Rabobank Groep. Bloomberg News quotes Rabobank as saying that “The expansion of GM

production, particularly in regions which already operate under a fairly low-cost production system, will have long-term implications upon the marginal cost of production and, subsequently, prices."

Rabobank noted that farmers in India and Brazil have started to use the technology and thus will contribute to yield increase. Brazil, the world's fifth-largest cotton-grower, is projected to become the largest growth market for biotech cotton. It noted that the inherent cost savings was expected to encourage the use of GM seed and thus strengthen the South American country's cotton exports.

See the full article at
http://www.bloomberg.com/apps/news?pid=10000086&sid=a5A1ygCQjxeY

BIOTECH AND IPR IN DEVELOPING COUNTRIES

Developing countries need to cope with the fast developing intellectual property rights (IPR) regime. They should ensure that their legislation and procedures emphasize the enforcement of IPR through administrative action and through the existing civil justice system. In like manner, efforts must be made to exploit the maximum possible benefits in terms of cost reduction and administrative efficiency from existing regional and international cooperation mechanism, through various bilateral agreements in IPR. These were some of the recommendations raised by K.K. Tripathi of India's Department of Biotechnology under the Ministry of Science and Technology in an article "Biotechnology and IPR regime: In the context of India and development countries."

Tripathi also called for developing countries to encourage policy research and analysis on IP subjects especially those concerning protection of plant varieties, traditional knowledge, folklore, and technology transfer.

Read the full paper in the Vol. 7, No. 2 issue of Asian Biotechnology and Development Review or email Tripathi at kkt@dbt.nic.in.

CROATIA PASSES LAW ON GMOS

The Croatian Government passed a new law on Genetically Modified Organisms (GMO) that replaced the "biotechnology-regulating provisions" of the Law on Protection of Nature. The United States Department of Agriculture reports that

the new law stipulates that the Ministry of Health will become the lead ministry for all biotech issues.

Previously, the Law on Protection of Nature and the Food Law including future sub-laws regulated the importation, transshipment, production, usage, and sale of products of agricultural biotech products (including all food, feed and seed). The GMO Law removed the previous provisions regarding biotechnology in the Law on Protection of Nature and replaced them as a new separate piece of legislation. The Food Law remains as the main law for regulating biotech food and feed.

See the USDA report in
http://www.fas.usda.gov/gainfiles/200506/146130111.doc.

CGIAR AWARDS FELLOWSHIPS TO EAST AFRICAN WOMEN CROP SCIENTISTS

The Gender and Diversity Program of the Consultative Group on International Agricultural Research (CGIAR) recently announced the names of the first recipients of a new fellowship for East African women crop scientists. The fellowship offers the recipients a two year mentoring relationship with a senior scientist in their field, as well as funds to support presentation of their research at a major scientific conference each year, among others.

This year's 11 winners come from national research institutions and universities in Kenya, Uganda, and Tanzania, such as the Kenya Agricultural Research Institute (KARI), the Makerere University in Uganda, and the Kenyatta University of Agriculture and Technology, Kenya. Winners were selected on the basis of their scientific achievement and leadership potential.

The next round of selection will take place in 2006. For more on the program, as well as the list of the fellows, visit
http://www.genderdiversity.cgiar.org/resource/women_fellowships.asp

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RESEARCH

WORKSHOP REPORT DETAILS SORGHUM GENOME RESEARCH

Members of the worldwide sorghum community met in 2004 at the Sorghum Genomics Planning Workshop. The workshop aimed to 1) obtain a status report on the development and accessibility of sorghum genome research information, technologies, and infrastructure; 2) identify future priorities and needs for sorghum genomics research; 3) better organize the sorghum community; and 4) foster sorghum improvement. The workshop report is now available online on the Plant Physiology Journal's website.

Sorghum is the fifth most important cereal crop in the world, providing food, feed, fiber, and fuel to much of the developing world. It is closely related to major crops such as sugarcane and pearl millet, and information on its genome may provide a better roadmap for studying the domestication of cereal crops. The complete genome of sorghum comprises about 700 million base pairs, 60% larger than that of rice, but one fourth the size of the maize genome.

Workshop participants proposed a three-stage strategy to complete the sequencing of the sorghum genome. This strategy would include gene space characterization, which would progress into a gold-standard physical map, and which would eventually end in a complete genome sequence. Participants also recognized the need for a unified sorghum database, similar to those for maize (the Maize GDB) and rice (Gramene) which are available online.

Africa is also sorghum's home, and scientists see the sequencing project as "an attractive vehicle for engagement of the African scientific community in genomics and its applications, in particular regarding documentation and analysis of in situ diversity that is presently inaccessible to Western scientists."

Read the article at http://www.plantphysiol.org/cgi/reprint/138/4/1898.

PLANT GENE LENDS ANTIBIOTIC RESISTANCE TO TOBACCO

Introducing antibiotic resistance genes into plant cells allows successful transformants to be selected on the basis of their survival in a medium containing a certain antibiotic. However, the source of these genes has hitherto been bacteria, and some scientists are concerned that horizontal gene transfer may occur, transferring DNA from plants into microbes, and resulting in the latter's antibiotic resistance.

In the latest issue of Nature, however, Ayalew Mentewab and C. Neal Stewart Jr. of the University of Tennessee report that "Overexpression of an Arabidopsis thaliana ABC transporter confers kanamycin resistance to transgenic plants." Their research makes use of a gene derived from *Arabidopsis*, called Atwbc19, three times larger than the antibiotic resistance gene from bacteria. Scientists transferred the gene cassette into tobacco plant cells, then subjected these cells to varying levels of kanamycin treatment. They found that using Atwbc19 alone was enough to make plant cells recover from a medium containing as much as 200 mg/l kanamycin. The cells were also resistant to kanamycin treatment alone, and not to other antibiotics such as geneticin, gentamycin, and streptomycin, whose chemical structures are similar to kanamycin.

Plants resulting from the transformation developed and grew normally, making the technique an ideal one for meeting biosafety requirements, since the gene is derived from a fellow plant species. The researchers propose that such a technique can be applied to agriculturally important species such as soybean, cotton, *Brassica* crops, and tomato, and even forest tree species such as elms, pines, and spruce.

Subscribers to Nature can read more at http://www.nature.com/nbt/journal/vaop/ncurrent/abs/nbt1134.html.

ROLE OF PLANT GENE IN HEAT TOLERANCE STUDIED

The greatest problems of plants in tropical climates are drought and high temperature stress. The latter inhibits plant photosynthesis, disabling nutrient accumulation and stunting plant growth. Plants have been known to also accumulate certain chemical compounds under salinity, drought, and temperature stress.

One of these chemicals, glycinebetaine (GB), is the subject of a recent study, where Xinghong Yang and colleagues from the Chinese Academy of Sciences Plant Physiology report that the "Genetic Engineering of the Biosynthesis of Glycinebetaine Enhances Photosynthesis against High Temperature Stress in Transgenic Tobacco Plants." Their findings appear in the latest issue of Plant Physiology.

Scientists introduced the betaine aldehyde dehydrogenase (BADH) gene from spinach into tobacco cells, allowing the transgenic cells to produce GB. The plants started accumulating GB, and resulted in their increased tolerance to high temperature stress during growth. Plants, to some extent, were also able to assimilate carbon dioxide better than their wild-type counterparts at temperatures

as high as 45°C, showing that their photosynthetic pathway had not been greatly damaged by the heat stress.

The findings suggest a new function of GB in plants, in that it can protect photosynthesis against high temperatures. They likewise lend strength to the option of introducing BADH into plant cells in order to effect heat tolerance, a process which bypasses biosafety concerns, since the gene can come from a fellow plant.

Plant Physiology subscribers can access the full article at http://www.plantphysiol.org/cgi/reprint/138/4/2299. Other readers can access the abstract at http://www.plantphysiol.org/cgi/content/abstract/138/4/2299.

LIGHT IMPROVES CARBON STORAGE, GROWTH IN RAPESEED

The future health of a young seedling depends largely on the amount of food reserves available in its seed. Successful storage of these reserves depends, in turn on photosynthesis, which can influence the seed's carbon economy, how carbon is stored, and plant fitness and productivity. Greater carbon storage is harder for oilseeds, since carbon supplies are constantly being converted into oil.

In the latest Plant Physiology Preview, Fernando D. Goffman and colleagues from Michigan State University report that "Light Enables a Very High Efficiency of Carbon Storage in Developing Embryos of Rapeseed."

By radioactively labeling all carbon sources in media supporting the growth of rapeseed embryos, scientists found that large amounts of light not only improved the efficiency of carbon storage, but also increased the growth rate of rapeseed plants. Despite the easy conversion of carbon into seed stores, scientists still found that increased amounts of light enhanced the conversion of carbon stores into oil.

Read the abstract at http://www.plantphysiol.org/cgi/content/abstract/138/4/2269. Plant Physiology subscribers can access the article at http://www.plantphysiol.org/cgi/reprint/138/4/2269.

DOCUMENT REMINDERS

FACT SHEET ON BIOTECH CROPS IN INDIA

There are now 14 biotech crops under development in India as of 2005. These include brinjal, cotton, cauliflower, cabbage, chickpea, groundnut, maize, mustard, okra, pigeonpea, potato, rice, sorghum, and tomato. A fact sheet on these crops outlining the organizations doing research and the specific transgene per specific crop was produced by the International Service for the Acquisition of Agri-biotech Applications –India Office. For a PDF of this fact sheet visit http://www.isaaa.org/kc/bin/docabinet/general/index.htm.

POSTER ON GM CROPS AVAILABLE FOR DOWNLOADING

About 1 billion acres of genetically modified crops are now planted globally. This concept is featured in a poster which the SEARCA-Biotechnology Information Center in the Philippines has made available for downloading. The poster which is in JPEG File Interchange Format (JPEG) is formatted for printing on a 2ft x 5ft (width x height) suitable for exhibits. It is best printed on tarpaulin material.

To view and download poster please visit http://www.bic.searca.org and click on <BIC Info Kits>.

ANNOUNCEMENTS

WORLD LIFE SCIENCE WEEK IN LONDON

London, United Kingdom is the site of the October 9-13, 2005 celebration of World Life Science Week. Events include a conference, exhibition, workshop classes, and partnering opportunities and networking events for delegates from Europe, the US and Asia. Coinciding with the UK hosting the European Union Presidency, the week will start with BioPartnering Europe and continue with the international exhibition CORDIA. Detailed information on the various events is available at http://www.cordiaconvention.com.

CANADA S BIOTECH WEEK

A series of various activities have been set to celebrate Biotechnology Week in Canada from September 26-30, 2005. Across country events include career fairs, tour of Canadian biotech companies, exhibits, and seminars with leaders of the industry and with federal and provincial decision makers. For more information, visit http://www.biotech.ca/imagenenation.

EUROPEAN BIOTECH CROSSROADS

Four major events – a biotech trade show; Bioagenda, a business and technology transfer convention; a seminar program with 40 workshops; and Biotalent, a recruitment convention – are features of European Biotech Crossroads scheduled November 28-30, 2005 at Lille Grand Palais, France. Online information may be obtained at http://www.bcbiotech.ca/scripts/index_.asp?action=31&P_ID=4850&N_ID=1&PT_ID=76&U_ID=0

CBT NEWS FEATURE

The Bridge to an Empire: Agricultural Practices of the Atrebates

Before an Empire crossed a Channel and made for an Isle, there were quiet tribes living amongst mountains and streams, forests and ice, knowing little of how Rome was slowly spreading out into the world. One of them was the Atrebates, or “the Villagers,” who made their home in France and the south of England. From 50 BC onwards, they were one of the most powerful tribes in Britain, a country fertile and green beneath its blistering cold, where tribal lords ruled the rolling hills and wide plains of an ancient land.

The Atrebates lived near the fertile Thames floodplain, where the silt-rich soil gave birth to wheat and barley, and provided a means of living for the members of the tribe. Tribal structure, indeed, was based on the belief that everyone had to serve a practical purpose within the community, and that everyone in the tribe had to work towards feeding it and defending its territory. As a result, the Atrebates tilled their land, raised their crops, and tended to their livestock for a greater part of their lives. Pigs and sheep were especially important to the tribe: the former provided meat, lard, and leather, while the latter was used to produce wool and fabrics.

The Atrebates, like the rest of Britain's pre-Roman tribes, worshipped gods. Theirs originated mostly from a culture deeply grounded in the fertility of the earth, in what the soil could offer, and how it could keep the tribe alive. Fertility was power – admired, revered, and feared, as it spelled the survival of the Atrebates. Fertility and land dictated lives, the distribution of people, territorial disputes, and spiritual concerns.

England seemed to be a green gem from afar, and to it, the Roman Empire was drawn. This migration, however, from "civilized" lands to "uncivilized" ones, was not much welcomed by the tribes. The Atrebates were one of the few to embrace the Romans, and one of the first to be Romanized, so much so that their capital was converted into a Roman city. The Calleva Atrebatum, or "Wooded Town," became the center of commerce and justice, and the crossroads through which goods and soldiers traveled.

Trade and agriculture grew under the Romans, and Britannia became a granary and metal workshop. From the mountains came lead and silver. From the fields came barley, wheat, and flax. Animals such as cattle, dogs, pigs, sheep, and goats filled the yards. Together, the Romans and Britons tilled land, cast coins, and celebrated harvests. They even produced a brew called cervesa, or cervesia, also known as Celtic Beer.

And, from out of the huts and small villages rose Roman villas, which could produce goods in surplus, and into which imports from the continent – such as fish sauce, wine, and spices – flowed. Agriculture was still the primary activity – crop rotation was practiced in the fields, grain was stored in barns, and water-powered mills and drying ovens abounded.

The same continued to be so over the next few hundred years. The Atrebates remained upon their lands, served their masters or watched over their slaves, and merged their pagan rites with Roman ones. Rome, however, was slowly in decline, loosening its hold upon its colonies, and leaving the Atrebates and its companion tribes in an Isle once more, across a Channel, untouched by an Empire – save for the vestiges of villas, the figments of the grandeur of Rome, and walls and memories built by soldiers and tribesmen who once worked side by side.

For more information on the Atrebates and Roman Britain, read Roman Villas And The Countryside by Guy de la Bedoyere at http://64.233.179.104/search?q=cache:D7PLvuz3lfUJ:www.madrigueras.biz/redir.cgi%3Furl%3Dhttp%253A%252F%252Fwww.romanbritain.freeserve.co.uk%252FCOUNTRYSIDE.HTM+atrebates+agriculture&hl=en

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